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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,396	12/18/2001	Kazuhiko Endo	PF-2088DIV	6839
466	7590	06/15/2004	EXAMINER	
YOUNG & THOMPSON 745 SOUTH 23RD STREET 2ND FLOOR ARLINGTON, VA 22202			HUYNH, YENNHU B	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 06/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/017,396

Applicant(s)

ENDO, KAZUHIKO

Examiner

Yennhu B. Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14, 16 and 17 is/are rejected.
- 7) ☒ Claim(s) 15, 18 and 19 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/18/01.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the Applicant's election filed on 3/10/04.

Election/Restrictions

Applicant's election with traverse of claims 1-19 in the reply filed on 3/10/04. Is acknowledged. The traversal is on the ground(s) that they are not as alternative species, but rather as genus species. This is not found persuasive because 37 CFR 1.142 requires a restriction requirement when separate species are within a single application. It would be also burdensome for examiner to make separate searches in to examine properly the additional species.

The requirement is still deemed proper and is there fore made FINAL.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statement filed 12/18/01 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. In this case the IDS filed under "Foreign Patent Application" has been placed in the application file, but the information copies has not been filed. Therefore the information to therein has not been considered.

Oath/Declaration

Oath/Declaration filed on 12/18/01 is accepted.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 8-10 & 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Maeda et al. (U.S. 5,554,570).

Maeda et al. disclose a method of forming insulating film, which include:

-Re. claim 1: forming an insulator having a main component of silicon dioxide having organic structure Si-H by CVD reactants (col.2 lines 8-19), wherein at least one kind of organic compounds, including benzene nucleuses phenyl derived from benzene, is used as a benzene nucleus source so that the insulator includes the benzene nucleuses (col.4 lines 39-54).

-Re. claims 2 & 4: wherein the benzene nucleus has bonding structure with silicon atoms, and wherein the organic substance as the benzene nucleus source is used together with a silicon source material (col.3 lines 46-55 and col. 4 lines 1-4).

-Re. claim 3 wherein at least one selected from the group consisting of phenyl-trimethylsilane and trimethoxylane is used as the benzene nucleus source (col. 4 lines 44-53 and col. 6 lines 30-45 and col. 6 lines 45-55).

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-Re. claim 8: wherein the organic substance comprises at least one selected from the group consisting of toluene, benzene and xylene (col. 4 lines 40-54).

-Re. claims 9 & 10: wherein the organic substance has a structure of a plurality of benzene nucleuses and selected from the group of naphthalene, biphenyl and anthracenes (col. 4 lines 39-54).

-Re. claim 11: wherein the CVD method is plasma CVD method (col.3 lines 45-47).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. (US. 5,554,570) in view of Yasuo et al (US. 4,923,948).

Maeda et al. disclose substantially all of the claimed features, but do not disclose wherein the organic substance as the benzene nucleus source is used alone, or free, or single without any silicon source material.

-Re. claims 5-7: Yasuo et al. Disclose a curable composition, which include composition containing organic substance as alkyl group source is can be used alone, free, or single without silicon atom, wherein the silicon atom having >1 hydrolyzable group and a silazane, or silicon can be used alone or combination with organic

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monoamine compound (col.5 & 6 lines 51-18; or col. 7 lines 9-60 or col.7 & 8 lines 66-2 or col. 13 lines 4-41)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Hochberg et al.'s using benzene nucleus source alone, free, or single without any silicon source material, into the process of Maeda et al., to improve the storage stability and adhesion to substrate of the component and organic substance.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. (US. 5,554,570) in view of Hochberg et al. (U.S. 4,981,724).

Maeda et al. also do not disclose wherein the CVD method is a low pressure CVD method.

-Re. claim 12: Hochberg et al. disclose deposition of silicon dioxide film, which include organic substance selected from the group of alkylsilane from 2-6 carbons into vacuum; wherein the silicon dioxide is performed by low pressure CVD method (col.7 lines 40-59).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Hochberg et al.'s silicon oxide deposited by LPCVD method, into the process of Maeda et al., to obtain an uniformity film and limit contamination as decreasing gas phase reactions.

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Claims 13, 14, 16 & 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. (US. 5,554,570) in view of Nakanishi et al. (U.S. 5,624,875).

Maeda et al. also do not disclose after the insulator has been formed the benzene nucleuses are removed from the insulator to form pores in the insulator (cl.13), wherein the removal by causing an elimination reaction for eliminating benzene from the insulator (cl.14); wherein the elimination reaction caused by a heat treatment of not less than 450C degrees (cl.16) and in an inert gas (cl.17).

-Re. claims 13, 14, 16 & 17: Nakanishi et al. disclose a process for producing inorganic porous material, which include removal of organic polymer from the polyethylene oxide (that is same function as silicon oxide) mixed with tetramethoxysilane to produce gel, by drying and heating to leave pores in the inorganic amorphous silica; and wherein the silica is free of impurities and benzene rings ([0021, 0028]); wherein the removal by causing an elimination reaction for eliminating benzene nucleuses from the insulator that caused by a heating at 20 –100 C degrees, and in an inert gas ([0028]).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine Hochberg et al.'s removal benzene nucleuses to form pores in the insulator, into the process of Nakanishi et al., to obtain a common dielectric as of porous silica structure used in the semiconductors.

With respect to the heating treatment temperature requires of not less than 450 C degrees is considered to involve routine optimization while has been held to be within the level of ordinary skill in the art, As noted In re Aller 105 USPQ233, 255 (CCPA

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1955). the selection of reaction parameters such as temperature and concentration would have been obvious.

Normally, it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result, which is different in kind, and not merely in degree from the results of the prior art. In re Dreyfus, 22 CCPA (Patents 830,73 F.2d 931, 24 USPQ 52; In re Waite et al., 35CCPA (Patents) 1117, 168F.2d 104, 77 USPQ 586. Such ranges are termed "critical" ranges, and the applicant has the burden of proving such criticality. In re Swenson et al., 30 CCPA (Patents) 809, 132 F.2d 1020, 56 USPQ 372; In re Scherl, 1193, 156 F.2d, 70 USPQ 204. However, even through applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art. In re Sola, 22 CCPS (Patents) 1313, 77 F.2d 627, 25 USQ 433; In re Normann et al., 32 CCPA (Patents) 1248, 150 F.2d 708, 66 USPQ 308; In re Irmischer, 32 CCPA (Patents) 1259, 150 F.2d 705, 66 USPQ 314. More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et al. 33 CCPA (Patents) 1250, 156 F. 2d239, 70 USPQ 412; Minnesota Mining and Mfg. Co. v. Coe, 69 App. D.C. 217, 99 R.2d 986, 38 USPQ 214; Allen et al. v. Coe, 77 App. D.C 324, 135 F.2d 11, 57 USPQ 136.

Allowable Subject Matter

Claims 15,18 &19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance: Prior art do not disclose a silica insulation film with a reduced dielectric constant, which include the steps of wherein the elimination reaction is caused by exposure to oxygen radicals generated in a plasma (cl.15); wherein the benzene nucleuses are removed by causing a combustion reaction in an oxygen atmosphere (cl.18); and wherein the CVD is carried at less than about 500 C degrees, to cause elimination reaction of the benzene

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nucleuses at the same time of deposition of the insulator to form pores in the insulator (cl.19).

The above limitations for claims 15,18 & 19 are neither anticipated nor rendered obvious over the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on statement of Reasons for Allowance."


.Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu B Huynh whose telephone number is 571-272-1692. The examiner can normally be reached on 8.30AM-7.00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr., can be reached on 571-272-1702. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-7724.

YNBH,
060804


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800